

**STATEMENT OF WORK**

**FOR**

**REMEDIAL ACTION/OPERATIONS & MAINTENANCE**

**LOWRY LANDFILL SUPERFUND SITE**  
**ARAPAHOE COUNTY, COLORADO**

**AUGUST 16, 2005**

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# **1 INTRODUCTION**

## **1.1 Purpose of the Statement of Work**

This Statement of Work (SOW) sets forth requirements for implementing the Remedial Action (RA) and performing ongoing Operations and Maintenance (O&M) activities at the Lowry Landfill Superfund Site (Site) as required by the Record of Decision (ROD), Explanation of Significant Differences (ESD), Minor Modifications of the ROD, and ROD Amendment documents listed below. Performance of the work described in this SOW by the Work Settling Defendants and review and approval of documents and activities described in this SOW by EPA shall be performed in accordance with the procedures described in the Consent Decree.

The Site background, characterization, summary of Site risks, and selected remedy are described in the Record of Decision for the Site, which was signed by the United States Environmental Protection Agency (EPA) Region 8 and the Colorado Department of Public Health and Environment (CDPHE) on March 10, 1994, as amended or clarified by the following:

1. Minor Modification, August 7, 1995
2. ESD, August 14, 1995
3. Minor Modification, March 21, 1996
4. ESD, October 24, 1997
5. Minor Modification, May 8, 2001
6. Minor Modification, September 30, 2002
7. ROD Amendment, August 12, 2005

Reference to the “ROD” in this SOW shall mean the 1994 ROD as modified by the ESDs, Minor Modifications and the ROD Amendment. Section 11 of the 1994 ROD, as modified by the Minor Modifications, ESDs, and the ROD Amendment, describes Remedial Action Objectives (RAOs) for each component of the RA and the respective Performance Standards for each component of the RA selected for the Site. More specifically, Section 8.0 of the 2005 ROD Amendment describes the Performance Standards for the RA selected for the south and north waste pits within the Former Tire Pile Area (FTPA).

EPA has certified completion of construction or RA for all components of the RA except for the FTPA waste pits (see Subsection 1.4.1 of this SOW for a list of completions). EPA certified construction completion when it determined that the remedial component was constructed in accordance with the pertinent EPA-approved design or planning documents. EPA certified completion of RA when it determined that construction was complete, the remedial component was operational and functional (O&F), and Performance Standards were achieved. O&F is defined as either one year after construction completion, or when EPA determines that the remedy is functioning properly and is performing as designed. This SOW sets forth requirements for completing construction and RA at the Site, and for performing O&M activities.

All activities identified in this SOW, except for review and approval of deliverables and community relations conducted by EPA, shall be performed by the Work Settling Defendants on behalf of all Settling Defendants. All submittals identified in this SOW shall be delivered to EPA and CDPHE in accordance with the schedule and document distribution requirements shown in Section 3 of this SOW and in accordance with Section XI (EPA Approval of Plans and Other Submissions) of the Consent Decree.

## **1.2 Site Description**

The Site is located near the intersection of East Hampden Avenue and Gun Club Road, approximately 20 miles southeast of downtown Denver, Colorado in unincorporated Arapahoe County. From the mid-1960s until 1980, the Site was operated as an industrial liquid waste and municipal solid waste co-disposal landfill. Liquid wastes disposed at the Site included hazardous substances such as volatile organic compounds and heavy metals. In 1980, waste disposal was restricted to municipal solid waste. In 1984, the Site was placed on the National Priority List (NPL). From 1984 to 1993, studies were performed to define the nature and extent of contamination, to estimate potential health and environmental risks, and to evaluate cleanup alternatives for the Site.

The ROD formally defines the remedy selected by EPA for the Site. The selected sitewide remedy utilizes containment, collection, and treatment to address the contamination at the Site and is consistent with EPA's *Presumptive Remedy for CERCLA Municipal Landfills*, EPA, 1993. The sitewide remedy consists of remedial components that address the operable units of groundwater, surface water, landfill gas, landfill solids, soils, and sediments. As indicated above and summarized below, EPA has certified completion of construction or RA for all components of the RA except the FTPA waste pits. O&M activities are ongoing for all RAs that have been certified as complete with the exception of wetlands mitigation for which work activities have been certified as complete by EPA.

## **1.3 Performance Standards**

Performance Standards include standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all Applicable or Relevant and Appropriate Requirements (ARARs). The Performance Standards for sitewide management, groundwater, surface water, WTP discharge, air quality, subsurface gas, FTPA waste pit RA, and institutional controls are as follows:

- The Performance Standards for sitewide management, groundwater, surface water, WTP discharge, air quality, and subsurface gas are set forth in the ROD, this SOW, and the EPA-approved O&M manuals and monitoring plans referenced below. Numerical Performance Standards are consistent with ARARs set forth in the ROD. In cases where no ARAR has been promulgated, Performance Standards are concentrations of chemicals that present an acceptable risk as determined by EPA. The establishment of Performance Standards based on ARARs or risk-based

concentrations is consistent with the hierarchy set forth in the August 14, 1995 ESD.

- The Performance Standards for FTPA north waste pit and south waste pit RA activities are set forth in the 2005 ROD Amendment.
- The Performance Standards for institutional controls at the Site are detailed in the EPA-approved *Final Institutional Controls Plan, Parsons, September 19, 2002*.

If any management plan, O&M manual, or monitoring plan must be updated in the future, Work Settling Defendants shall request changes in the form of addenda to the plan or manual. Such addenda shall be submitted to EPA and CDPHE for review and comment. Any such addenda are subject to EPA approval authority.

## **1.4 Remedial Actions**

The following subsections list each component of the RA and its completion status, and describe the RA activities to be completed by the Work Settling Defendants under this SOW.

### **1.4.1 Status of Remedial Actions**

The following RA components have received EPA certifications of construction completion, RA completion, or Work completion, as of the effective date of the Consent Decree:

<b>Remedial Action Component</b>	<b>Description</b>	<b>Remedial Action Completion Status</b>
Institutional Controls	Institutional Controls Plan.	EPA Approval dated September 26, 2002.
Surface Water Removal Action (SWRA)	Blanket drain with clay cover, and treatment of groundwater in onsite Water Treatment Plant (WTP).	EPA Certification of RA Completion dated August 11, 2005.
Wetlands Mitigation	Constructed wetlands to replace wetlands lost during construction of SWRA.	EPA Certification of RA Completion dated December 23, 1999 and Work Completion dated August 12, 2005.
Landfill Gas (LFG) Extraction and Treatment System	LFG collection and treatment system.	EPA Certification of RA Completion dated February 11, 1998.

<b>Remedial Action Component</b>	<b>Description</b>	<b>Remedial Action Completion Status</b>
North Boundary Barrier Wall (NBBW) System	Subsurface barrier wall at northern Site boundary; groundwater collection drain upgradient of wall; and injection trench downgradient of wall.	EPA Certification of RA Completion dated March 27, 1998.
North Toe Extraction System (NTES)	Shallow groundwater collection trench at northern toe of landfill mass.	EPA Certification of RA Completion dated September 10, 1998.
Shallow Groundwater Containment, Collection, and Diversion System, East/South/West Site Boundaries	Soil-bentonite slurry wall surrounding east, west, and south sides of landfill, and an observational approach to groundwater gradient control across the slurry wall.	EPA Certification of RA Completion dated September 30, 1998 (slurry wall) and January 25, 1999 (monitoring system).
MW38 Area Gradient Control Contingency Measure	Groundwater extraction via wells from the MW38 sand channel.	EPA Certification of RA Completion dated August 11, 2005.
New Water Treatment Plant	WTP to pre-treat Site waters onsite, followed by discharge to and final treatment in a Publicly Owned Treatment Works (POTW).	EPA Certification of RA Completion dated August 11, 2005.
North Face Cover	Placement of additional clay cover over North Face of landfill.	EPA Certification of RA Completion dated January 7, 2000.
Well Abandonment Program	Removal of wells that were constructed improperly or no longer serve a useful purpose.	EPA Certification of RA Completion dated November 17, 1997.

Remedial Action Component	Description	Remedial Action Completion Status
Performance and Compliance Monitoring	<p>Development and implementation of long term monitoring plans to assess compliance with Performance Standards for all components of the selected remedy.</p> <p>For groundwater, installation of the monitoring well network described in the <i>Groundwater Monitoring Plan, (EMSI, 2005a)</i> and <i>Addendum 1 to the Groundwater Monitoring Plan (EMSI 2005b)</i>.</p>	EPA Certification of Construction Completion dated August 12, 2005.
FTPA Middle Waste Pit and Treatment Cell	Excavation of FTPA middle pit, construction of onsite treatment cell, and treatment of cell material to Performance Standards.	EPA Approval of Final Interim Closeout Report for the Middle Waste Pit Remediation and Construction of the Treatment Cell dated August 3, 2005, and EPA Certification that treatment cell Performance Standards have been met, dated August 12, 2005.

## 1.4.2 Remedial Components to be Completed

The Work Settling Defendants shall complete RA at the south and north FTPA waste pits and final closure of the FTPA treatment cell, which contains treated wastes from the FTPA middle waste pit. The Work Settling Defendants shall complete the selected RA for groundwater by implementing the sitewide groundwater monitoring program. Both the FTPA Waste Pit and groundwater monitoring RA activities are discussed below.

### 1.4.2.1 FTPA Waste Pits

RA at the south and north waste pits generally consists of the recovery of non-aqueous phase liquids (NAPLs) and final capping of the two waste pits to achieve the Performance Standards established in the 2005 ROD Amendment. When compliance

with the Performance Standards for recovery of NAPL is achieved, recovery wells/piezometers and associated infrastructure shall be removed or abandoned and disturbed surface areas shall be repaired. Final covers for both waste pits have been constructed as documented in the *Draft Interim Construction Closeout Report, FTPA Waste Pit Covers and Make-up and Process Waterlines, Lowry Landfill Superfund Site, Parsons, September 28, 2001*. No additional cover installation shall be required, other than Work Settling Defendants shall repair and maintain the existing covers to ensure the Performance Standards established in the 2005 ROD Amendment are achieved.

Between 1998 and 1999, waste material from the FTPA middle pit was excavated and placed into the FTPA treatment cell in accordance with the EPA-approved *Final Design, FTPA Waste Pit Remedy, Lowry Landfill Superfund Site, Parsons, July 24, 1998*. The middle pit was then backfilled with clean fill, regraded, and revegetated. Work Settling Defendants prepared an interim closeout report entitled *Final Interim Construction Closeout Report, Middle Pit and Construction of Treatment Cell, Former Tire Pile Area Waste Pit Remedy, Lowry Landfill Superfund Site Remedial Action, Parsons, July 21, 2005* documenting construction completion. EPA approved the *Final Interim Construction Closeout Report* on August 3, 2005.

Between 1999 and 2003, treatment of waste pit material in the FTPA treatment cell and final testing of the cell material were performed in accordance with the *Final Design, FTPA Waste Pit Remedy, Lowry Landfill Superfund Site, Parsons, July 24, 1998*. Subsequent sampling demonstrated that the treatment cell contents met all Performance Standards, as documented in a letter report entitled, *Closure of the Former Tire Pile Area Treatment Cell, Lowry Landfill Superfund Site, Parsons, August 8, 2003*. In a letter dated August 12, 2005, EPA certified that the Performance Standards for treatment of the cell contents were achieved. Under this SOW, Work Settling Defendants shall perform all activities to ensure final closure of the FTPA treatment cell to achieve Performance Standards established in the ROD.

#### **1.4.2.2 Groundwater Monitoring Program**

Work Settling Defendants shall perform all activities necessary to implement the *Groundwater Monitoring Plan (EMSI, 2005a)* and *Addendum 1, Groundwater Monitoring Plan (EMSI, 2005b)*. Sitewide groundwater monitoring RA will be complete when sufficient groundwater quality and gradient data have been collected to allow EPA to make a determination of compliance with groundwater Performance Standards.

### **1.5 Ongoing O&M Activities**

Work Settling Defendants shall perform all activities required to operate, maintain, and monitor the effectiveness of the RA for the Site in accordance with this SOW and the Consent Decree. The following O&M activities are ongoing and Work Settling Defendants shall continue to perform them as described in the operative O&M manual and/or monitoring plan listed below:

<b>O&amp;M Activity</b>	<b>Operative Document</b>
Sitewide Management	1) Final Site Management Plan, Parsons, August 25, 1995. 2) Revised Contingency Plan, Parsons, September 17, 1999, as amended on January 15, 2000. 3) Final Revised Waste Management Plan, Parsons, December 20, 1999. 4) Final Records Management Plan, Parsons, August 25, 1995.
Institutional Controls	Final Institutional Controls Plan, Parsons, September 19, 2002, supplemented on September 25, 2002 and amended on February 28, 2005.
Landfill Gas Extraction and Treatment System	1) Final Operations and Maintenance Manual, Landfill Gas Remedy, Parsons, January 30, 1998. <ul style="list-style-type: none"> <li>• Addendum 1, September 25, 2002.</li> <li>• Addendum 2, October 10, 2003.</li> </ul> 2) Final Compliance Monitoring Plan, Landfill Gas Remedy, Parsons, November 14, 1997.
Water Treatment Plant	1) Final Operations and Maintenance Manual, Water Treatment Plant, Parsons, July 21, 2005. 2) Industrial Wastewater Discharge Permit No. I-218, Metro Wastewater Reclamation District and City of Aurora, August 1, 2004.
Groundwater Monitoring	1) Groundwater Monitoring Plan, EMSI, February 18, 2005. 2) Addendum 1, Groundwater Monitoring Plan, EMSI, August 11, 2005.
Surface Water Monitoring	Final Interim Compliance Monitoring Plan, Parsons, February 16, 1996.
Landfill Covers	Final Operations and Maintenance Plan, Landfill Solids, Soils, and Sediments, Parsons, June 18, 1999.
Health and Safety	Health and Safety Plan for Sitewide Operations and Maintenance Activities, Parsons, October 14, 2003.

## 2 SCOPE OF WORK

The Work Settling Defendants shall perform all activities required to: implement the FTPA waste pit component of the RA described in the 2005 ROD Amendment; perform final closure of the FTPA treatment cell; implement the sitewide groundwater monitoring RA; perform ongoing O&M activities detailed in the O&M manuals and monitoring plans listed above; and perform new O&M activities described below. The Work Settling Defendants shall also routinely report RA and O&M activities, and perform other support activities as required by EPA. All of this work is organized into the following seven tasks:

Task 1 – Update Existing Management Plans

Task 2 – Remedial Action

Task 3 – Operations and Maintenance

Task 4 – RA/O&M Reporting

Task 5 – Other Activities

Task 6 – Annual Oversight Meetings

Task 7 – Work Plans

Task descriptions follow:

### 2.1 Task 1 – Update Existing Management Plans

Work Settling Defendants shall review and update the following management plans that were approved by EPA under the Administrative Order for Remedial Design/Remedial Action, EPA Docket No. CERCLA VIII-95-05 (“UAO”). Work Settling Defendants shall update the following plans to reflect the scope of RA and O&M work to be performed under this Consent Decree, and to comply with the requirements of the Consent Decree.

- *Final Site Management Plan, Parsons, August 25, 1995*
- *Revised Contingency Plan, Parsons, September 17, 1999, as amended on January 15, 2000*
- *Final Revised Waste Management Plan, Parsons, December 20, 1999*
- *Final Records Management Plan, Parsons, August 25, 1995*
- *Final Compliance Monitoring Plan, Landfill Gas Remedy, Parsons, November 14, 1997*

Work Settling Defendants shall update the *Final Site Management Plan* to include an organizational structure tailored for implementing the RA and O&M requirements of this SOW. At a minimum, the organizational structure shall include the project coordinator, the supervising contractor, the QA Official, and the name(s) of key implementation contractor(s), if known, for all aspects of the work to be performed under this SOW. For any aspect of the work, the supervising contractor may assume the role(s) of project coordinator or QA Official except that the supervising contractor shall not assume the roles of both the project coordinator and the QA Official. The names, titles, and

qualifications of the supervising contractor and QA Official shall be included, as well as information to demonstrate that the supervising contractor meets the quality requirements of ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs", by submitting a copy of the supervising contractor's Quality Management Plan (QMP) that contains the appropriate and necessary information to perform the work in this SOW. The responsibilities, authority, and lines of communication of all key team members shall also be clearly described. Finally, the updated *Site Management Plan* shall include the onsite location of the Consent Decree, and indicate that the Consent Decree is available for review by all entities performing work at the Site.

Work Settling Defendants shall submit verification of management plan reviews, together with any updates to the plans, to EPA and CDPHE for review and comment. All updated plans are subject to EPA approval. Once EPA has approved them, the updated plans shall supersede the existing plans.

## **2.2 Task 2 – Remedial Action**

RA shall consist of the FTPA RA and implementation of the groundwater monitoring program described in Subsection 1.4.2.2 of this SOW.

The FTPA RA generally consists of the following activities:

- Removal or abandonment in-place of existing pilot-test equipment and related infrastructure (soil vapor extraction (SVE) wells and conveyance piping and heating system, treatment equipment, etc.) used in the *in-situ* heating pilot-test at the south pit;
- Installation of NAPL extraction wells, pumps and conveyance and product storage systems in the south and north FTPA waste pits;
- Extraction of NAPL from the south and north FTPA waste pits as necessary to meet the Performance Standards established in the 2005 ROD Amendment;
- Sampling and analysis of extracted liquids;
- Treatment or disposal of the extracted NAPL at an offsite hazardous waste facility pursuant to the updated Waste Management Plan;
- Upon completion of NAPL recovery activities, removal or abandonment in-place of the NAPL recovery system (extraction wells, conveyance piping, storage tanks, etc.) and repair of the waste pit covers as necessary to correct damage, if any, to the covers during removal of the NAPL recovery system, or as otherwise necessary;
- Removal or abandonment of external piping and equipment associated with the above-ground treatment cell; and

- Final closure of treatment cell in accordance with the FTPA RA Work Plan.

### **2.2.1 FTPA RA Work Plan**

Work Settling Defendants shall submit to EPA and CDPHE for review and comment an RA Work Plan for completion of RA of the FTPA waste pits. The FTPA RA Work Plan shall be developed in accordance with the requirements of Section VI (Performance of the Work), Paragraph 13 of the Consent Decree and shall provide for construction of the remedy to achieve the RA objectives and Performance Standards established in the ROD and this SOW.

The FTPA RA Work Plan shall include, but not be limited to, the following:

- A discussion of RA objectives and Performance Standards set forth in the ROD;
- Plans, specifications, and implementation schedules for NAPL recovery from the south and north waste pits, and closure of the two waste pits and treatment cell;
- A construction quality control plan;
- Standard Operating Procedures (including NAPL recovery, a waste characterization sampling procedure, and decontamination);
- Requirements for conducting a preconstruction conference; and
- Reporting requirements.

The FTPA RA Work Plan shall indicate that air monitoring and health and safety monitoring/protection will be performed in accordance with the *Health and Safety Plan for Sitewide Operations and Maintenance Activities, Parsons, October 14, 2003*.

A separate Contingency Plan for RA will not be required because relevant contingency measures will be included in the updated Contingency Plan. The RA Work Plan shall incorporate the updated Contingency Plan by reference.

A separate Waste Management Plan for RA will not be required because relevant waste management requirements will be included in the updated Waste Management Plan. The RA Work Plan shall incorporate the updated Waste Management Plan by reference.

A description of the required contents of the FTPA RA Work Plan is presented in Subsections 2.2.1.1 through 2.2.1.4 of the SOW. Work Settling Defendants shall prepare draft and final versions of the FTPA RA Work Plan for review and comment by EPA and CDPHE, and approval by EPA in accordance with the schedule listed in Subsection 3.1 of this SOW.

### **2.2.1.1 Remedial Action Objectives and Performance Standards**

RA objectives and Performance Standards for the south and north waste pits, as set forth in the ROD and discussed in Subsection 1.4.2 above, and for closure of the FTPA treatment cell, shall be described in detail.

### **2.2.1.2 Closure Design**

As part of the FTPA RA Work Plan, Work Settling Defendants shall submit to EPA and CDPHE closure design details for the FTPA waste pits and treatment cell. Design details shall include:

- Design rationale;
- Results of additional field sampling and measurements;
- Drawings and specifications; and
- Implementation schedule.

Work Settling Defendants shall provide rationales for proposed design decisions, along with all supporting calculations, and shall present sampling data and measurements. Drawings shall depict the nature, location, size, and interrelationships of remedial activities, and specifications shall be of sufficient detail to enable procurement and implementation of the design by a construction contractor. Drawings may be submitted at one-half (50 percent) of full scale in the draft submittals, but full-size drawings shall be included in the final submittal. An implementation schedule for closure shall be included in both draft and final submittals.

### **2.2.1.3 Construction Quality Assurance/Quality Control**

As part of the FTPA RA Work Plan, Work Settling Defendants shall prepare a Construction QC Plan. The purpose of the Construction QC Plan is to ensure that the completed RA meets or exceeds all requirements of the final design. The Construction QC Plan shall detail the approach to QC during construction activities, and shall specify the scope of construction QC testing, versus that of QA monitoring. The Work Settling Defendants and/or their contractors shall perform QC testing during RA activities in accordance with the final design documents. The QA official shall independently verify that the required QC testing is being performed, and that the testing results and documentation conform to the construction specifications. Ultimately, however, Work Settling Defendants shall be responsible for all activities necessary to manage, control, and document work to ensure compliance with the project requirements, plans, and specifications.

The following items shall be described in the Construction QC Plan:

- Responsibilities, authorities, and lines of communication for all organizations and key personnel involved in implementing QC procedures;

- Observations, tests and/or sampling that will be used to monitor construction, and the frequency of these activities;
- Description of the reporting requirements, including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. Work Settling Defendants shall include a description of the project file to be maintained during construction activities, which satisfies the reporting requirements described herein. Work Settling Defendants shall include provisions for the final storage of all records, consistent with the updated Records Management Plan and the requirements of Section XXV (Retention of Records) of the Consent Decree;
- Corrective measures that shall be implemented if QC requirements are not met; and
- Procedures that shall be used to provide timely response to comments and unpredictable events.

Approval of the Construction QC Plan by EPA pursuant to Section XI (EPA Approval of Plans and Other Submissions) of the Consent Decree is required before Work Settling Defendants begin construction activities.

At the completion of construction, the QA Official shall be required to certify that, to the best of his knowledge based on observations, inspections, and tests, that no substantial deviations from the approved drawings and specifications, as amended by approved change directives, occurred. The QA Official's independent review shall be of sufficient scope to permit the required certification. The QA Official's certification is distinct from Work Settling Defendants' requesting certification of completion of the RA in accordance with Section XIV (Certification of Completion) of the Consent Decree.

#### **2.2.1.4 Standard Operating Procedures**

Standard Operating Procedures (SOPs) shall be prepared for routine or generally anticipated activities associated with the FTPA RA, such as:

- Recovery well drilling and installation;
- Fluid level measurements;
- Adjustments to pump set points;
- Recovery well abandonment; and
- Waste characterization plan to collect the data necessary to estimate VOC mass removal from the south and north waste pits.

SOPs shall be stand-alone documents for each activity that can be easily referenced by field personnel.

#### **2.2.1.5 Preconstruction Conference**

Work Settling Defendants shall schedule a Preconstruction Conference to occur at least two (2) weeks before the start of construction activities. Participants shall include all parties involved in the RA including, but not limited to, EPA, CDPHE, construction contractor(s), Work Settling Defendants and/or their representatives, the Health and Safety Official, and the QA Official. The meeting shall establish relationships among all parties involved in implementing the RA. The meeting agenda shall include:

- Introduction of attendees and their affiliations;
- Review of work scope and Performance Standards;
- Review of construction QC and QA requirements;
- Review of project schedule;
- Roles and responsibilities of team members and regulatory agencies;
- Lines of communication;
- Document control procedures;
- Review of procedures to resolve problems encountered during RA;
- Review of procedures to obtain EPA approval of RA modifications;
- Review of emergency actions and contingency measures; and
- Review of activities for construction completion.

Work Settling Defendants shall prepare a meeting summary and distribute to all attendees within two (2) weeks following the Preconstruction Conference.

#### **2.2.1.6 Reporting Requirements**

Work Settling Defendants shall submit RA Status Reports to EPA and CDPHE to allow EPA to determine whether implementation of the RA is in compliance with the Consent Decree. Work Settling Defendants shall submit these reports as part of the RA/O&M Status Reports, as described in Subsection 2.4 of this SOW and Section X (Reporting Requirements) of the Consent Decree. Such reports shall address FTPA RA activities until EPA issues a Certification of Completion for the FTPA waste pit remedy, pursuant to Section XIV (Certification of Completion), Paragraph 53 of the Consent Decree. RA Status Reports shall be submitted to EPA and CDPHE on a quarterly basis during RA.

As appropriate, the RA Status Reports shall include:

- Product thickness measurements and maps of product thickness;
- Volume of product recovered during the reporting period;
- Recovered volume versus time for each pit and/or recovery well;
- Summary of amounts and locations of product disposal or treatment;
- Change directives if they affect final design;
- Test and survey reports including a summary of QC testing results; and
- Schedule updates.

#### **2.2.2 Certification of Completion of FTPA RA**

Certification of completion of RA at the FTPA shall involve a pre-certification inspection

and preparation of a Closeout Report(s) that includes a request for certification of completion.

#### **2.2.2.1 Pre-Certification Inspection**

In accordance with Section XIV (Certification of Completion), Paragraph 53 of the Consent Decree, within 90 days after the Work Settling Defendants conclude that the RA has been fully performed and that all Performance Standards have been attained, Work Settling Defendants shall schedule and conduct a pre-certification inspection. Pre-certification inspection participants shall include the EPA and CDPHE, at a minimum.

#### **2.2.2.2 FTPA Closeout Report(s)**

Work Settling Defendants shall submit to EPA and CDPHE an RA Closeout Report or reports as described in Section XIV (Certification of Completion), Paragraph 53 of the Consent Decree. In addition to the elements required by Paragraph 53 of the Consent Decree, the Report shall include a construction chronology, a list of construction modifications, pre-certification inspection corrections, and documentation (e.g., test results) substantiating that the Performance Standards and RA objectives have been met. The Report shall include a narrative summary of RA activities, record drawings of all constructed facilities, and summaries of QA audits. In addition, the Report shall include a description of the removal of any waste materials, their origin, disposition, location of placement or treatment, and certificates of destruction, as appropriate. Closeout Reports may be submitted for individual components of the FTPA RA (north pit, south pit, treatment cell) as each component is completed, or one closeout report may be submitted following completion of the entire FTPA RA.

The Closeout Report(s) shall include a request for Certification of Completion, signed by the Work Settling Defendants or Work Settling Defendants' representative, that attests to the following:

*To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

#### **2.2.3 Groundwater Monitoring Program**

Work Settling Defendants shall implement the sitewide groundwater monitoring program as described in the *Groundwater Monitoring Plan (EMSI, 2005a)* and *Addendum 1 to the Groundwater Monitoring Plan (EMSI, 2005b)* to collect sufficient groundwater quality and gradient data to allow EPA to make a compliance determination. Groundwater monitoring results shall be reported to EPA and CDPHE in the RA/O&M Status Reports described in Subsection 2.4 of this SOW.

### **2.3 Task 3 – Operations and Maintenance**

Operations and maintenance of the sitewide remedy are ongoing activities that Work Settling Defendants shall continue to perform under the Consent Decree. Existing, ongoing O&M activities shall continue to be performed by the Work Settling Defendants under the Consent Decree in accordance with their operative EPA-approved O&M manuals and/or monitoring plans listed in Subsection 1.5 of this SOW and repeated below. Modifications or clarifications to these O&M activities, as detailed in the new manuals or addenda identified above and described below, shall also be performed under the Consent Decree.

#### **2.3.1 Institutional Controls**

Work Settling Defendants shall implement institutional controls in accordance with the *Final Institutional Controls Plan (Parsons, 2002)*, as supplemented on September 25, 2002 and amended (Parsons, 2005c).

#### **2.3.2 Groundwater Monitoring**

Work Settling Defendants shall implement monitoring of Site groundwater in accordance with the *Groundwater Monitoring Plan (EMSI, 2005a)*, and *Addendum 1, Groundwater Monitoring Plan (EMSI, 2005b)*.

Work Settling Defendants shall implement early warning monitoring in accordance with the EPA-approved early warning monitoring plans.

#### **2.3.3 Groundwater Extraction**

Work Settling Defendants shall continue operations, maintenance, and monitoring of existing groundwater extraction systems under this SOW in accordance with the performance criteria detailed in the *Groundwater Monitoring Plan (EMSI, 2005a)*.

Operations, maintenance, and monitoring procedures for all groundwater extraction and collection systems shall be described in a new O&M Manual for Groundwater Extraction. This manual shall include a detailed discussion of operating objectives and performance criteria for each extraction system. Operating rationale and control logic, historic flow rates and water levels, operating set-points, water handling procedures, equipment maintenance schedules, and emergency procedures shall also be detailed in the manual. Work Settling Defendants shall submit a draft manual to EPA and CDPHE for review and comment in accordance with the schedule in Subsection 3.1 of this SOW. Work Settling Defendants shall respond to EPA comments and submit a final manual to EPA and CDPHE for review and EPA approval in accordance with the schedule in Subsection 3.1.

#### **2.3.4 Water Treatment Plant**

Work Settling Defendants shall implement operations, maintenance, and monitoring of the WTP in accordance with the *Final Operations and Maintenance Manual, Water Treatment Plant (Parsons, 2005b)*.

### **2.3.5 Surface Water Monitoring**

Work Settling Defendants shall implement monitoring of Site surface water in accordance with the *Final Interim Compliance Monitoring Plan (Parsons, 1996)*.

### **2.3.6 Landfill Gas**

Work Settling Defendants shall implement operations, maintenance, and monitoring of the landfill gas collection and treatment system in accordance with *the Final Operations and Maintenance Manual, Landfill Gas Remedy (Parsons, 1998b)* (LFG O&M Manual) as amended, and *Final Compliance Monitoring Plan, Landfill Gas Remedy (Parsons, 1997)*.

Work Settling Defendants shall prepare an addendum to the LFG O&M Manual to describe changes to operations, maintenance, and monitoring procedures to accommodate the cover regrading project described in the Engineering Design and Operations Plan for the Section 6 landfill (EDOP)(*Waste Management, 2004*). Changes to the landfill gas collection system shall generally consist of addition of deep gas extraction wells and operation of these or other existing wells.

Work Settling Defendants shall submit the addendum to EPA and CDPHE for review and comment and EPA approval in accordance with the schedule in Subsection 3.1 of this SOW. Work Settling Defendants shall respond to EPA comments, finalize the addendum, and obtain EPA approval prior to implementing any changes.

### **2.3.7 Landfill Covers and Stormwater**

Work Settling Defendants shall implement operations, maintenance, and monitoring of the Section 6 landfill cover, closed FTPA treatment cell, reclaimed FTPA waste pits, surface water removal action, and stormwater conveyance ditches in accordance with the *Final Operations and Maintenance Plan, Landfill Solids, Soils, and Sediments (Parsons, 1999b)*.

Work Settling Defendants shall prepare an O&M Manual for Landfill Covers and Stormwater based on the *Final O&M Plan, Landfill Solids, Soils, and Sediments (Parsons, 1999b)*. The new document shall address operations, maintenance and monitoring of the Section 6 landfill cover, closed FTPA treatment cell, reclaimed FTPA waste pits, surface water removal action, and stormwater conveyance ditches. In addition, Work Settling Defendants shall prepare a new Health and Safety Plan for the Section 6 landfill cover. Details of the new O&M Manual and Health and Safety Plan follow:

#### **2.3.7.1 O&M Manual for Covers and Stormwater**

The Operations and Maintenance Manual for Covers and Stormwater shall consolidate the existing *Final Operations and Maintenance Plan, Landfill Solids, Soils, and Sediments (Parsons, 1999b)* with all operating and maintenance requirements described in the EDOP approved by CDPHE on 8/16/05 (*Waste Management, 2004*), and any changes associated with closure of the FTPA treatment cell and waste pits. The Operations and Maintenance Manual for Covers and Stormwater shall fully incorporate the CDPHE- approved EDOP either by repeating the EDOP in the new manual, or the EDOP may simply be incorporated by reference. Either way, upon approval by EPA, the manual shall supercede the *Final Operations and Maintenance Plan, Landfill Solids, Soils, and Sediments (Parsons, 1999b)*.

Work Settling Defendants shall submit the O&M Manual for Covers and Stormwater to EPA and CDPHE for review and comment and EPA approval in accordance with the schedule in Subsection 3.1 of this SOW. Work Settling Defendants shall respond to EPA comments, finalize the manual, and obtain EPA approval prior to implementing any changes.

#### **2.3.7.2 Covers Health and Safety Plan**

A Covers Health and Safety Plan (HASP) shall be prepared to address O&M activities associated with implementing the EDOP, exclusively. The Covers HASP shall supercede health and safety requirements detailed in the *Health and Safety Plan for Sitewide Operations and Maintenance Activities (Parsons, 2003b)* for activities solely associated with implementing the EDOP.

Work Settling Defendants shall submit the Covers HASP to EPA and CDPHE for review only in accordance with the schedule in Subsection 3.1 of this SOW.

#### **2.3.8 Certification of Completion**

Certification of completion of O&M shall involve a pre-certification inspection, a Work Closeout Report, and EPA issuance of a Certification of Completion of Work.

##### **2.3.8.1 Pre-Certification Inspection**

In accordance with Section XIV (Certification of Completion) of the Consent Decree, within 90 days after Work Settling Defendants conclude that all phases of the Work (including O&M) have been fully performed, Work Settling Defendants shall schedule and conduct a pre-certification inspection. Pre-certification participants shall include EPA and CDPHE, as a minimum.

##### **2.3.8.2 Work Closeout Report(s)**

Work Settling Defendants shall submit to EPA and CDPHE a Work Closeout Report as

described in Section XIV (Certification of Completion) of the Consent Decree. In addition to the elements required by Paragraph 54 of the Consent Decree, the Report shall include adequate documentation to demonstrate that (1) all aspects of the Work (including O&M) have been fully performed by the Work Settling Defendants in accordance with the Consent Decree, and (2) discontinuation of the Work will not cause Performance Standards to be exceeded. Work Closeout Reports may be submitted for individual components of the sitewide remedy as each O&M component is completed, or one Closeout Report may be submitted following completion of sitewide O&M.

The Work Closeout Report(s) shall include a request for Work Closeout Certification, signed by the Work Settling Defendants or Work Settling Defendants' representative, that attests to the following:

*To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

## **2.4 Task 4 – RA/O&M Reporting**

Work Settling Defendants shall prepare RA/O&M Status Reports and annual updates of laboratory Practical Quantitation Limits. In addition, Work Settling Defendants shall prepare Periodic Compliance Reports for the WTP as required by the Industrial Wastewater Discharge Permit. Work Settling Defendants shall provide copies of the Periodic Compliance Reports to EPA and CDPHE. Each of these reports is discussed below.

### **2.4.1 RA/O&M Status Reports**

Work Settling Defendants shall prepare RA/O&M Status Reports as described in Section X (Reporting Requirements) of the Consent Decree. Items to be included in the Status Reports include:

- Summary of activities conducted during the reporting period for both FTPA RA and O&M activities;
- Summary of voluntary monitoring and/or response actions;
- Updated database of WTP influent and effluent, environmental monitoring data, and early warning monitoring data;
- Evaluation of groundwater compliance;
- Evaluation of effectiveness of groundwater containment features;

- Evaluation of surface water compliance;
- Landfill gas system compliance;
- Landfill cover compliance;
- Off-site waste shipments;
- Problems encountered;
- Recommendations; and
- Schedule of planned activities for next two (2) reporting periods.

Work Settling Defendants shall submit RA/O&M Status Reports quarterly for one year following entry of the Consent Decree, or until otherwise directed by EPA, and subsequently shall submit them semi-annually in accordance with the criteria described in the EPA-approved Groundwater Monitoring Plan. Quarterly reports shall cover calendar year quarters and be submitted in accordance with the schedule presented in Subsection 3.1 of this SOW. Semi-annual reports shall cover the first and second halves of each calendar year, and be submitted in accordance with the schedule presented in Subsection 3.1 of this SOW.

#### **2.4.2 Annual PQL Update**

Work Settling Defendants shall submit to EPA and CDPHE annual updates of laboratory Practical Quantitation Limits (PQL) for compounds of concern that are monitored at the Site for which the PQL exceeds a numeric performance standard. Work Settling Defendants shall prepare updates for each environmental medium that is monitored at the Site. PQL updates shall be submitted by the last day of each year.

All analytical laboratories performing analytical services for RA and O&M shall be accredited under the guidelines established by National Environmental Laboratory Accreditation Conference (NELAC). Demonstration of current certification of participation in the NELAC program or National Environmental Laboratory Accreditation Program (NELAP) shall be provided with each PQL update.

#### **2.4.3 WTP Periodic Compliance Reports**

Periodic Compliance Reports (PCRs) for the WTP are required under Industrial Wastewater Discharge Permit No. I-218, which is administered by the Denver Metropolitan Wastewater Reclamation District (Metro). Work Settling Defendants shall copy EPA and CDPHE on the text portion of all PCRs. Work Settling Defendants shall provide electronic data to EPA and CDPHE upon EPA's request.

## **2.5 Task 5 – Other Activities**

Other activities may include: voluntary work performed by the Work Settling Defendants that is not required by the ROD, the Consent Decree, or this Statement of Work; and support work as requested by EPA.

Voluntary work may include, but is not limited to, installation and/or sampling of additional monitoring wells not required by any EPA-approved plan or manual, treatability studies intended to optimize O&M, or general Site improvements. Work Settling Defendants shall inform EPA and CDPHE of the schedule, objectives and general approach to any voluntary work prior to beginning the work. EPA approval of the voluntary work is not required. Work Settling Defendants shall include results of the voluntary work, including analytical data, in O&M Status Reports. If, after completing any voluntary work, the Work Settling Defendants believe a modification to an existing EPA approved plan or manual is warranted, the Work Settling Defendants shall submit a proposed modification to the plan or manual to EPA and CDPHE in accordance with Section 1.3 of this Statement of Work.

From time-to-time, EPA may also request support from the Work Settling Defendants for technical assistance, community relations, preparation of data summaries or other items for Five Year Review reports, or other activities. EPA's project coordinator shall notify Work Settling Defendants of the specific need and define a process, scope of work, and timeframe for the requested services. Work Settling Defendants shall provide the support requested by EPA.

## **2.6 Task 6 – Annual Oversight Meetings**

Annually, prior to August 1, the EPA Project Coordinator for the Site will convene a meeting with the Work Settling Defendants' Project Coordinators to discuss the project oversight costs incurred by EPA, including State Costs over the past EPA fiscal year and the anticipated scope of EPA project oversight, including State oversight, the estimated aggregate number of hours that EPA employees will spend on oversight activities, the estimated contractor costs for EPA project oversight, and the estimated State Costs for the next succeeding EPA fiscal year. In advance of the meeting, the EPA Project Coordinator will provide to the Work Settling Defendants' Project Coordinators a written description of the anticipated scope of EPA project oversight, including State oversight, an estimate of the number of EPA employee hours, the estimated contractor costs for EPA project oversight, and the estimated State Costs for the next succeeding EPA fiscal year for discussion at the meeting. EPA will provide a summary of oversight contracts currently in place, including a description of the general scope of work, the period of performance, and the contract award amount for each contract. All estimates of future oversight effort and costs discussed at the meeting are preliminary, may represent only a portion of EPA's oversight costs and are non-binding. If the Work Settling Defendants' Project Coordinators have concerns about EPA's or the State's anticipated scope of future oversight or the estimated aggregate number of EPA employee hours, or the estimated contractor costs, or the estimated State Costs and their concerns are not

resolved at or in connection with the annual meeting convened by the EPA Project Coordinator, then the Work Settling Defendants' Project Coordinators shall provide a list of the unresolved concerns in writing to the EPA Project Coordinator within 14 days after the meeting. Within 30 days after the EPA Project Coordinator receives the list of unresolved concerns, the Assistant Administrators and the Principals shall meet to address the concerns. The Assistant Administrators and the Principals may, by mutual agreement, use facilitation or other non-binding alternative dispute resolution in an effort to resolve Work Settling Defendants' objections. If a resolution is not achieved, then EPA shall determine the scope and estimated EPA employee hours and contractor costs for future oversight and estimated State Costs for the year in question.

If EPA intends to make a change in the scope of EPA or State oversight that will likely increase by fifty percent (50%) or more the number of EPA employee hours spent on oversight or the amount of State Costs or contractor costs finally estimated for that year in accordance with Subparagraph 58.a of the Consent Decree, or if EPA becomes aware that the estimated EPA contractor oversight costs for any EPA fiscal year will likely exceed by fifty percent (50%) or more the amount finally estimated for that year in accordance with Subparagraph 58.a of the Consent Decree, then EPA shall promptly notify the Work Settling Defendants and, upon request by Work Settling Defendants, initiate the process described above and in Subparagraph 58.a. of the Consent Decree with regard to the estimated time or cost exceedence.

## **2.7 Task 7 – Work Plans**

The Work Settling Defendants shall implement all existing and future work plans developed by the Work Settling Defendants and approved by EPA pursuant to the UAO or the Consent Decree (e.g. the “Work Plan for Additional Geologic Characterization of Potential Lineaments” approved by EPA on February 28, 2005 and amended by EPA on May 26, 2005).

### 3 DOCUMENT SUBMITTALS

#### 3.1 Schedule of Deliverables

The following documents or activities shall be delivered/communicated to EPA and CDPHE under this SOW:

Document Name or Activity	Delivery Date a/
<b>Planning Document</b>	
Draft Plan Updates, as necessary	30 days after entry of CD
Final Plan Updates	30 days after resolution of EPA comments
<b>Remedial Action</b>	
Draft FTPA Work Plan	60 days after lodging
Final FTPA Work Plan	30 days after resolution of EPA comments
Pre-Certification Inspections	Within 90 days of RA completion
FTPA Closeout Reports	60 days after pre-cert inspection
<b>Operations and Maintenance</b>	
Draft O&M Manual for Groundwater Extraction	90 days after entry of CD
Final O&M Manual for Groundwater Extraction	30 days after resolution of EPA comments
Draft Addendum to LFG O&M Manual	90 days after entry of CD
Final Addendum to LFG O&M Manual	30 days after resolution of EPA comments
Draft O&M Manual for Covers and Stormwater	90 days after entry of CD
Final O&M Manual for Covers and Stormwater	30 days after resolution of EPA comments
Covers Health and Safety Plan	90 days after entry of CD
RA/O&M Status Reports (Quarterly)	90 days after end of calendar quarter
RA/O&M Status Reports (Semi-Annually)	90 days after end of calendar half-year; April 1 and October 1 of each year
Annual PQL Update	December 31 <sup>st</sup> of each year

a/ Delivery date applies to calendar days

#### 3.2 Work Plans for Further Response Actions

If Work Settling Defendants agree to perform a further response action selected by EPA in accordance with Paragraph 21 of the Consent Decree, Work Settling Defendants shall submit a Work Plan required for such a response action within 60 days after receipt of written notification from EPA that such a work Plan is required.

#### 3.3 Document Distribution

All of the documents listed above shall be distributed as follows:

EPA	3 copies
CDPHE	2 copies

The type of document distributed, i.e., hard copy or electronic copy, shall be in accordance with the requirements of the *Final Records Management Plan, Parsons, August 25, 1995*, as updated under Subsection 2.1 of this SOW.

#### **4 REFERENCE DOCUMENTS**

EMSI, 2005a, Groundwater Monitoring Plan, Lowry Landfill Superfund Site, Engineering Management Support, Inc., February 18, 2005.

EMSI, 2005b, Addendum 1, Groundwater Monitoring Plan, Lowry Landfill Superfund Site, Engineering Management Support, Inc., August 11, 2005.

EPA, 1993, Presumptive Remedy for CERCLA Municipal Landfill Sites, EPA 540-F-93-035, OERR Directive No. 9355.0-49FS, September.

EPA, 1994, EPA Superfund Record of Decision, Lowry Landfill Superfund Site, March 10, 1994.

EPA, 1995, Minor Modification of the March 10, 1994 Record of Decision, Lowry Landfill Superfund Site, Arapahoe County, Colorado. United States Environmental Protection Agency. Memo from Marc E. Herman, Remedial Project Manager, to Lowry Landfill Superfund Site File. August 7, 1995.

EPA, 1995, Explanation of Significant Differences, Lowry Landfill Superfund Site, prepared by EPA Region 8, signed August 14, 1995.

EPA, 1996, Minor Modification of the March 10, 1994 Record of Decision, Lowry Landfill Superfund Site, Arapahoe County, Colorado. United States Environmental Protection Agency. Memo from Marc E. Herman, Remedial Project Manager, to Lowry Landfill Superfund Site File. March 21, 1996.

EPA, 1997, Explanation of Significant Differences, Lowry Landfill Superfund Site, prepared by EPA Region 8, dated March, 1997.

EPA, 2001, Minor Modifications of the March 10, 1994 Record of Decision, Lowry Landfill Superfund Site, Arapahoe County, Colorado. United States Environmental Protection Agency. Memo from Gwendolyn Hooten, Remedial Project Manager, to Lowry Landfill Superfund Site File. May 8, 2001.

EPA, 2002, Minor Modifications of the March 10, 1994 Record of Decision, Lowry Landfill Superfund Site, Arapahoe County, Colorado. United States Environmental Protection Agency. Memo from Gwendolyn Hooten, EPA Remedial Project Manager, to Lowry Landfill Superfund Site File. September 30, 2002.

EPA, 2005, Amendment to the Record of Decision, Lowry Landfill Superfund Site, August 12, 2005.

Parsons, 1995a, Final Site Management Plan, Lowry Landfill Superfund Site, August 25, 1995.

Parsons, 1995b, Final Records Management Plan, , Lowry Landfill Superfund Site,

August 25, 1995.

Parsons, 1996, Final Interim Compliance Monitoring Plan, Lowry Landfill Superfund Site, February 16, 1996.

Parsons, 1997, Final Compliance Monitoring Plan, Landfill Gas Remedy, Lowry Landfill Superfund Site, November 14, 1995.

Parsons, 1998a, Final Design, FTPA Waste Pit Remedy, , Lowry Landfill Superfund Site, July 24, 1998.

Parsons, 1998b, Final Operations and Maintenance Manual, Landfill Gas Remedy, Lowry Landfill Superfund Site, January 30, 1998.

Parsons, 1999a, Final Revised Waste Management Plan, Lowry Landfill Superfund Site, December 20, 1999.

Parsons, 1999b, Final Operations and Maintenance Plan, Landfill Solids, Soils, and Sediments, Lowry Landfill Superfund Site, June 18, 1999.

Parsons, 2000, Revised Contingency Plan, Lowry Landfill Superfund Site, September 17, 1999, amended on January 15, 2000.

Parsons, 2001, Draft Interim Construction Closeout Report, FTPA Waste Pit Covers and Make-up and Process Waterlines, Lowry Landfill Superfund Site, September 28, 2001.

Parsons, 2002, Final Institutional Controls Plan, Lowry Landfill Superfund Site, September 19, 2002.

Parsons, 2003a, Closure of the Former Tire Pile Area Treatment Cell, Lowry Landfill Superfund Site, August 8, 2003.

Parsons, 2003b, Health and Safety Plan for Sitewide Operations and Maintenance Activities, Lowry Landfill Superfund Site, October 14, 2003.

Parsons, 2005a, Final Interim Construction Closeout Report, Middle Pit and Construction of Treatment Cell, Lowry Landfill Superfund Site, Remedial Action, July 21, 2005.

Parsons, 2005b, Operations and Maintenance Manual, Water Treatment Plant, Lowry Landfill Superfund Site, July 21, 2005

Parsons, 2005c, Addendum 1 to Final Institutional Controls Plan, Lowry Landfill Superfund Site, February 28, 2005.

Waste Management, 2004, Denver Arapahoe Disposal Site (Section 6) Engineering Design and Operations Plan, October, 2004.